

Sedra and Smith Receive Lifetime Achievement Awards from the Information Technology Association of Canada

On 5 October 2010, Adel S. Sedra, dean of engineering at the University of Waterloo and Kenneth C. Smith, Professor Emeritus, University of Toronto, received Lifetime Achievement Awards from the Information Technology Association of Canada (ITAC) in Ottawa. The two IEEE Fellows and long-term members of the IEEE Solid-State Circuits Society were honored for their “substantial contributions to Canadian microelectronics through a lifetime of accomplishments.”

The ITAC Lifetime Achievement Award, begun in 1999 to promote the visibility of the Canadian information technology industry as an important and growing contributor to the country's GDP and to increase its appreciation by the general public, annually recognizes two individuals who have made significant and meritorious contributions throughout their working careers toward the establishment and growth of the microelectronics, photonics, wireless, and radio industry in Canada in one of the two following categories:

1) Nontechnical: policy, management, infrastructure, and activities that

Past recipients of ITAC Lifetime Achievement Awards include the following IEEE Fellows:

- **(2009) Graham Jullien**—IEEE Fellow 2003 “for contributions to the application of number theoretic techniques in signal processing”
- **(2008) Savvas Chamberlain**—IEEE Life Fellow 1991 “for contributions in CCD imagers and MOSFETs”
- **(2007) C. Andre T. Salama**—IEEE Life Fellow 1987 “for contributions to the development of power semiconductor devices and the design of integrated circuits”
- **(2001) Dick Foss**—IEEE Life Fellow 1993 “for leadership in the design and testing of memory circuits”
- **(2000) Roy Boothroyd**—IEEE Life Fellow 1969 “for special work on solid-state techniques and their applications.”

promote the growth of the industry in general.

2) Technical: advances by recipients that were made while in industry, academia, and government, or some combination thereof.

Two awards are given each year, normally one from each category;

but occasionally two from the same group. This year, both Prof. Sedra and Prof. Smith were recognized for their achievements in the second category.

Nominations for the award come from the ITAC community. Information about ITAC may be found at itac.ca.

—Laura Fujino



Mark McGrath of Sigma Designs Technology, Canada, presenting Lifetime Achievement Awards to Adel Sedra (left) and Kenneth C. Smith.



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DL Un-Ku Moon Delivers DL Talks Across the United States and Canada on Emerging ADCs

“Synthesizable ADCs” Attracts Special Interest

In a DL swing from SSCS-Vancouver on 6 July 2010 to SSCS-Lehigh Valley on 19 July, SSCS-Central Texas on 22 July, SSCS-New York on 17 September, and SSCS-Montreal a month

later, Prof. Un-Ku Moon of Oregon State University spoke on “Emerging ADCs—New/Interesting Ideas for ADC Design.”

Among the ADC architectures presented in his talks, he said the topic that generated the most interest and discussion was the possibility of

synthesizing ADCs using a standard digital tool such as Verilog/VHDL.

Abstract—Stochastic ADCs Combat Variability

“Stochastic ADCs”—the “Mostly Digital and Hopefully Synthesizable ADCs” is an interesting ADC architecture created

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Can We Fully Synthesize ADC?

Add Digital-Like Analog Blocks to Digital Library

- Match Supply Pitch and Library Rules
- Generate Other Files Required by Synthesis Tool

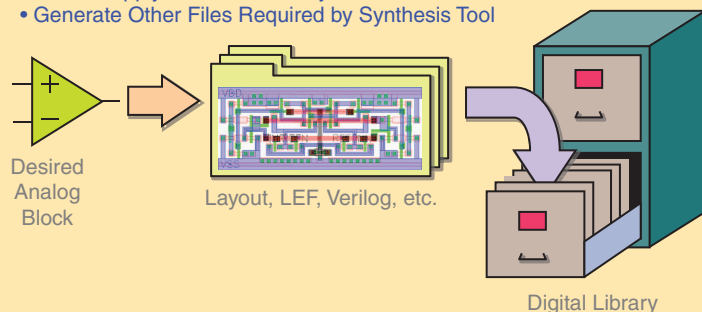


FIGURE 1

This Just Might Work...
Entire ADC Described in Verilog/VHDL

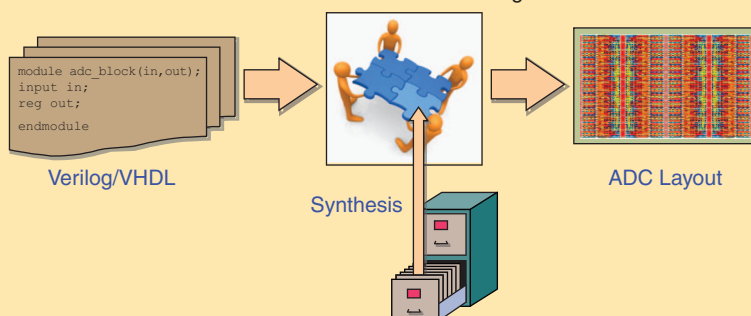


FIGURE 2

to combat variability. As comparators are scaled to digital cell-like dimensions, their input-referred offsets grow; both constant (random mismatch) and variable (random noise). Once the offsets exceed 1/2 LSB, a change must be made to maintain performance. Rather than choosing to calibrate out the static mismatches, one can choose stochastic

averaging. Many redundant comparators, when averaged, can suppress both constant and varying sources of offset, with knowledge of the expected statistical distribution of said offsets.

This theory was put to the test and reported in a paper by Weaver et al. [1].

Over 7,000 comparators, each designed with similar dimensions to

a digital cell, were placed on a die. All the comparators were identical and in parallel; that is, each comparator had the same voltage reference, with the exception of each comparator's internal inherent offset as a unique voltage reference. The expected measured offset distribution was Gaussian. By shifting two Gaussian distributions (two applied voltages), we were able to achieve a linearity exceeding a raw Gaussian. Moreover, as more and more comparators were enabled on the chip, the measured input-referred noise truly decreased.

As a result, Weaver realized that if the comparators can be digital size, i.e., made into a digital cell or made of digital cells, nothing prevents a stochastic ADC from being synthesized as a digital circuit (Figure 1). Once the comparator or the equivalent comparator functionality is in the library, the comparator can be instantiated directly from some VHDL or Verilog code (Figure 2). Standard digital synthesis procedure would then be followed. Imagine that you need to design an ADC in a new, modern, deep-submicron process, and all you would have to do is synthesize some code. In fact, Weaver et al. succeeded in doing this, the details of which will be published soon.

—Katherine Olstein

Reference

- [1] S. Weaver, B. Hershberg, D. Knierim, and U. Moon, "A 6b stochastic flash analog-to-digital converter without calibration or reference ladder," in *Proc. IEEE Asian Solid-State Circuits Conf.*, Nov. 2008, pp. 373–376.

DL Marcel Pelgrom Presents "The Different Faces of Variability" at SSCS-Penang and Singapore in October

In a whirlwind visit to SSCS-Penang (Malaysia) on the evening of 12 October and SSCS-Singapore, at the Institute

of MicroElectronics (IME) the next day, SSCS DL Marcel Pelgrom addressed SSCS chapter members and guests with "The Different Faces of Variability."

According to Penang Chapter Chair Boon Leng Lim, the Malay-

sian semiconductor industry contributes a significant percentage to the country's export income today, having become a hub for semiconductor manufacturing starting as early as the mid 1970s. However, it

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